



Delayed Ultrasound-Guided Intercostal Cryoneurolysis for Persistent Pain After Rib Fractures and Tube Thoracostomy: A Case Report



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Introduction

Persistent pain after rib fractures is common and can impair breathing, sleep, mobility, and recovery. Poor pain control increases the risk of atelectasis, pneumonia, longer hospitalization, and prolonged opioid use. Standard care relies on multimodal systemic analgesia with or without regional anesthesia, but nerve blocks with local anesthetic alone provide only short-term relief.

Cryoneurolysis is a percutaneous technique similar to an ultrasound-guided nerve block but uses localized cold to create a reversible conduction block by disrupting axons distal to the treatment site while preserving connective tissue, allowing regeneration. It can provide weeks to months of analgesia and is increasingly used for posttraumatic and postsurgical pain, including rib fracture pain.

We report a patient with persistent posttraumatic chest wall pain after rib fractures and tube thoracostomy who had marked improvement after ultrasound-guided intercostal cryoneurolysis, described here in accordance with the CARE case report framework.

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Case Description

A 70-year-old man (167.6 cm, 69.4 kg, ASA III) presented after an 8-foot fall with multiple intra-abdominal injuries and left rib fractures with hemothorax requiring tube thoracostomy. He underwent emergent splenectomy and ICU admission; his course was complicated by a persistent pancreatic leak requiring distal pancreatectomy and drain placement.

Over a month later, he re-presented with persistent pain limiting respiration and was readmitted with leukocytosis, dyspnea, and failure to thrive. CT showed an increased pancreatic fluid collection and a moderate left pleural effusion with atelectasis. Broad-spectrum antibiotics were started for possible sepsis from pancreatic leak versus pneumonia. He continued to have severe, inspiratory left-sided chest pain, impairing pulmonary recovery.

The Regional and Acute Pain service recommended ultrasound-guided intercostal cryoneurolysis of the left fifth, sixth, and seventh intercostal nerves. Despite additional rib fractures, his pain pattern was most consistent with neuropathic pain from the prior tube thoracostomy at these dermatomes.

After consent, he was placed in the lateral decubitus position with standard monitoring. Using a high-frequency linear ultrasound probe, the target intercostal nerves were identified at the posterior axillary line. After sterile preparation, 2 mL of 1% lidocaine was injected at each level, and a cryoneurolysis needle was advanced under continuous ultrasound guidance. Cryoneurolysis was performed at approximately –70 °C for two 106-second cycles per nerve.

The procedure was well tolerated, with immediate improvement in pain. At the two-week telephone follow-up, he reported left chest-wall pain of 1/10 with resolution of pleuritic and neuropathic pain. At four weeks, he reported 0/10 pain, no opioid or over-the-counter analgesic use, and no procedure-related complications.

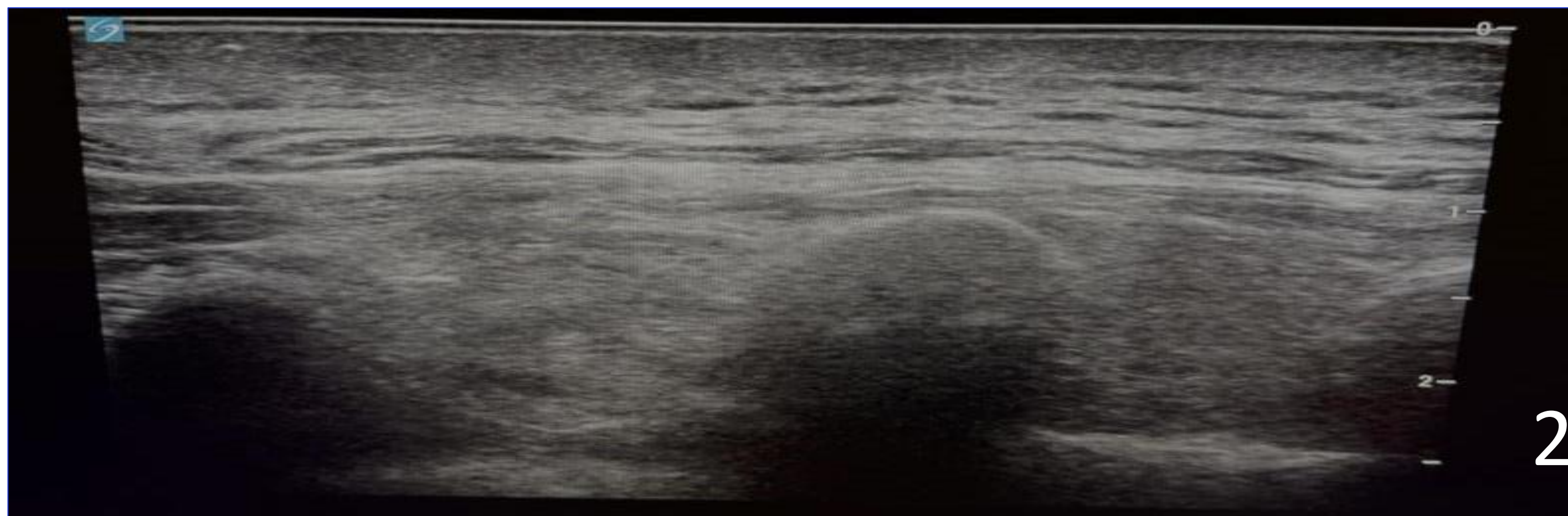


Figure 1. Ultrasound image demonstrating target anatomy during intercostal cryoneurolysis at the posterior axillary line.

Discussion

This case describes successful ultrasound-guided intercostal cryoneurolysis for persistent chest wall pain more than one month after rib fractures and tube thoracostomy. Ongoing pain limited inspiratory effort and daily activities, making prolonged analgesia clinically important.

Cryoneurolysis uses extreme cold to injure a peripheral nerve, typically causing reversible axonotmesis with Wallerian degeneration distal to the treatment site while preserving the epineurium and perineurium, allowing regeneration.^{1,3,4} Compared with single-injection peripheral nerve blocks, it often provides weeks of analgesia rather than hours or days.^{1,4} For patients with prolonged pain after rib fractures, this extended effect is appealing when repeat blocks are impractical or when reducing opioid use is a priority.

Interest in intercostal cryoneurolysis has grown in acute and subacute thoracic pain. Reports indicate that ultrasound-guided intercostal cryoneurolysis is feasible and may lower pain scores and opioid requirements in traumatic rib fractures.^{2,5,6} Ultrasound visualization of the rib, pleura, and soft tissues may enhance precision and reduce complications relative to landmark-based techniques.^{4,7,8}

In this case, pain persisted despite multimodal therapy and was thought to impair ventilation. After cryoneurolysis, the patient reported marked pain relief, no immediate complications, and sustained benefit for four weeks. Although a single case cannot prove causality, the timing of improvement supports considering this technique for selected patients with persistent posttraumatic thoracic pain.

Risks include pneumothorax, bleeding, transient dysesthesia, neuritis, and incomplete or variable analgesia.^{8–10} Appropriate patient selection, assessment of anticoagulation status, and careful ultrasound-guided technique are essential. Because analgesia can last weeks, counseling should address temporary sensory changes and gradual resolution.

This case adds to emerging evidence that intercostal cryoneurolysis may be a useful adjunct for prolonged analgesia after chest wall injury. Larger prospective studies are needed to define optimal patient selection, timing, comparative effectiveness, and safety.